

CLAIMS

1) A connectable four-wheel drive vehicle (1) comprising an engine (4) having a drive shaft (5); two
5 main drive wheels (3) connected permanently to the drive shaft (5) by the interposition of a gearbox (10) having a first clutch (8); and two secondary drive wheels (2) selectively connectable to the drive shaft (5) by a connectable drive system (15); the vehicle (1) is
10 **characterized in that** the connectable drive system (15) comprises a second clutch (17) which, on one side, is connected mechanically to the drive shaft (5) upstream from the gearbox (10), and, on the other side, is connected mechanically to the secondary drive wheels (2).

15 2) A vehicle (1) as claimed in Claim 1, wherein the second clutch (17), on one side, is connected with a fixed velocity ratio to the drive shaft (5) upstream from the gearbox (10), and, on the other side, is connected with a fixed velocity ratio to the secondary drive wheels
20 (2).

3) A vehicle (1) as claimed in Claim 1 or 2, wherein the gearbox (10) comprises a number of gears; the connectable drive system (15) comprising a gear train
(16), the velocity ratio of which is such that, when a
25 given synchronous gear of the gearbox (10) is engaged, the input and output of the second clutch (17) have the same speed.

4) A vehicle (1) as claimed in Claim 3, wherein said

synchronous gear is the third gear of the gearbox (10).

5) A vehicle (1) as claimed in Claim 3 or 4, wherein the gear train (16) is located downstream from the second clutch (17).

5 6) A vehicle (1) as claimed in Claim 3 or 4, wherein the gear train (16) is located upstream from the second clutch (17).

7) A vehicle (1) as claimed in one of Claims 1 to 6, wherein the second clutch (17) is controllable to
10 transmit a torque ranging from zero to a maximum value.

8) A vehicle (1) as claimed in Claim 7, wherein the second clutch (17) is an oil-bath clutch.

9) A vehicle (1) as claimed in Claim 7 or 8, wherein the second clutch (17) comprises an actuator (22) for
15 adjusting the position of the second clutch (17) and therefore the value of the torque transmitted by the second clutch (17).

10) A vehicle (1) as claimed in Claim 7, 8 or 9, wherein the connectable drive system (15) is controlled
20 by a control unit (23) comprising a first sensor (24) for detecting the rotation speed (V_a) of the secondary drive wheels (2); a second sensor (25) for detecting the rotation speed (V_p) of the main drive wheels (3); and a differential block (26) for generating an error signal
25 (E) proportional to the difference between the rotation speed (V_a) of the secondary drive wheels (2) and the rotation speed (V_p) of the main drive wheels (3); the second clutch (17) being controlled by the control unit

(23) as a function of the error signal (E).

11) A vehicle (1) as claimed in Claim 10, wherein the velocity ratio of the gear train (16) is such that, when a given synchronous gear of the gearbox (10) is engaged, the input and output of the second clutch (17) have the same angular speed; the control unit (23) comprising a disabling block (30) for preventing activation of the second clutch (17) when the engaged gear of the gearbox (10) is higher than the synchronous gear.

12) A vehicle (1) as claimed in Claim 10, wherein the velocity ratio of the gear train (16) is such that, when a gear of the gearbox (10) higher than a given maximum gear of the gearbox (10) is engaged, then the input of the second clutch (17) has a lower angular speed than the output of the second clutch (17); the control unit (23) comprising a disabling block (30) for preventing activation of the second clutch (17) when the engaged gear of the gearbox (10) is higher than the maximum gear.

13) A vehicle (1) as claimed in one of Claims 1 to 12, wherein the main drive wheels (3) are the rear wheels, and the secondary drive wheels (2) are the front wheels.

14) A vehicle (1) as claimed in Claim 13, wherein the engine (4) is at the front, and is connected to the main rear drive wheels (3) by a power train (7) comprising the first clutch (8) and a first propeller

shaft (9) terminating in the gearbox (10) at the rear; a first differential (11) being cascade-connected to the gearbox (10), and from which extend two axle shafts (12), each integral with a respective rear drive wheel (3).

5 15) A vehicle (1) as claimed in Claim 14, wherein the first clutch (8) is located at the front and housed in a casing integral with the engine (4).

10 16) A vehicle (1) as claimed in Claim 14, wherein the first clutch (8) is located at the rear and housed in a casing integral with the gearbox (10).

17) A vehicle (1) as claimed in Claim 13, wherein the engine (4) is located centrally; the first clutch (8) and the gearbox (10) being located at the rear.

15 18) A vehicle (1) as claimed in Claim 17, wherein the drive shaft (5) is connected on one side to the first clutch (8) to transmit power to the main drive wheels (3), and is connected on the other side to the second clutch (17) to transmit power to the secondary drive wheels (2).

20 19) A vehicle (1) as claimed in one of Claims 1 to 18, wherein the connectable drive system (15) comprises a second differential (19) driven by the second clutch (17) and connected to two axle shafts (20) integral with the secondary drive wheels (2).

25 20) A connectable four-wheel drive vehicle (1) comprising an engine (4) having a drive shaft (5); and four wheels (2, 3), of which two front and two rear, driven by the drive shaft (5); the vehicle (1) is

characterized in that the drive shaft (5) is connected on one side to the front wheels (2) and on the other side to the rear wheels (3).